Name: _____ **Date:** _____

Answer Key: Blast Off with Bluey: Pre-K Quantum Particle Quest

Can a toy be in two places at once? Analyze the weird ways very tiny particles behave through interactive play scenarios.

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1. If Bluey's 'Magic Xylophone' made her disappear and reappear behind a wall without walking around it, which tiny science secret is she using?

Answer: A) Quantum Tunneling

Quantum tunneling is like a microscopic 'magic trick' where a particle goes through a wall it shouldn't be able to pass.

2. In the world of the very small, a ball can be a speck of dust (particle) and a _____ at the same time!

Answer: B) Wave

Wave-particle duality means that at the smallest scale, things act like both solid objects and wiggly waves.

3. True or False: If you are hiding in a box, a scientist can know EXACTLY where you are and EXACTLY how fast you are wiggling at the same time.

Answer: B) False

The Heisenberg Uncertainty Principle says we can't know both position and speed perfectly at the same time.

4. Imagine a cat in a box that is both 'happy' and 'grumpy' UNTIL you open the lid. What do scientists call this mix-up?

Answer: B) Superposition

Superposition is when a tiny thing exists in two different states at once until we look at it.

5. If you have two 'Best Friend' particles, and you tickle one on Earth, the other one wiggles on the Moon instantly! This is called _____.

Answer: C) Entanglement

Quantum entanglement links two particles so that what happens to one affects the other, no matter the distance.

6. True or False: If you fly in a rocket ship super fast, your birthday would happen slower than your friend's birthday on Earth.

Name: _____ **Date:** _____

Answer: A) True

Time dilation means time actually moves slower for things moving at very high speeds.

7. Heavy things like a Giant Bowling Ball stretch Space and Time like a trampoline. What do we call this stretching?

Answer: A) General Relativity

General Relativity explains that mass curves the fabric of spacetime, which we feel as gravity.

8. A Black Hole is so heavy and curvy that not even _____ can escape its pull!

Answer: A) Light

Black holes have such strong gravity that even light, the fastest thing in the universe, gets trapped.

9. True or False: Energy and Mass are like two different outfits for the same person ($E=mc^2$).

Answer: A) True

Einstein's famous equation shows that mass and energy are interchangeable forms of the same thing.

10. If you look at the smallest piece of a LEGO brick through a super-science lens, you find things are made of 'packets' called:

Answer: B) Quanta

Quantum physics gets its name from 'quanta,' which are the tiny, discrete packets of energy everything is made of.